

Solution of sheet 2

1. Images are better displayed than text on CRT monitors. By nature, the illumination of the phosphor dots on the CRT monitors change gradually from pixels to the adjacent pixel compared to the somewhat abrupt change on LCD monitors. This causes the gradual changes in color between the image pixels that gives the required smoothness of the picture. The same characteristic make the text appears more better on the LCD monitors since the abrupt changes makes the text clear. This in addition to some other factors like the dependency of the view quality on the viewer angle on LCD and high illumination on CRT monitors

2. Pin plotter conceptual model: The programmers (graphics creator) works in 2D to create 2D and 3D graphics using function calls or user interfaces. Hence, He works out the required projection, shading, hidden surface removal, etc., to reduce everything to 2D objects
3D Graphics system conceptual model: The programmers (graphics creator) works directly in the domain of his problem to create 2D and 3D graphics using function calls. He specifies objects, shading methods, the camera (viewer) specification, and object material specification. The Graphics system (library and GPU) does the projection, shading, etc. to produce the image.

3. The solution is as follows:
For a 1280×1024 pixels frame refreshed progressively 72 times per second
The total number of pixels in one frame is $1280 \times 1024 = 1310720$. This number of pixels must be read 72 times per second. Hence, the timer for reading one pixel is given by
$$Time\ for\ reading\ one\ pixel = \frac{1}{1310720 \times 72} = 10.6\ nano\ seconds$$
For a 480×640 frame that operates at 60 Hz but is interlaced
The total number of pixels in one frame is $480 \times 640 = 307200$. This number of pixels must be read 30 times per second. Hence, the timer for reading one pixel is given by
$$Time\ for\ reading\ one\ pixel = \frac{1}{307200 \times 30} = 108.5\ nano\ seconds$$

4. Each frame for a 480×640 pixel video display contains only about 300k pixels whereas the 2000×3000 pixel movie frame has 6M pixels, or about 20 times as many as the video display. Thus, it can take 20 times as much time to render each frame if there are a lot of pixel-level calculations

5. In a one-point perspective, two faces of the cube is parallel to the projection plane, while in a two-point perspective only the edges of the cube in one direction are parallel to the projection. In the general case of a three-point perspective there are three vanishing points and none of the edges of the cube are parallel to the projection plane

6. The demonstrator should share her/his information in this respect with the student and asks them to prepare a report after internet search. The report must be discussed with the student when presented.